# Estimating the Economic Impact of Secondhand Smoke Exposure in Indiana in 2010

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# ABSTRACT

Introduction: This study updates the 2007 estimate of the health-related costs of secondhand smoke (SHS) exposure for the residents of Indiana.

Methods: Costs of SHS related mortality and morbidity were estimated using national attributable risk values for diseases that are known to be causally related to SHS smoke exposure both for adults and children. Estimated costs included hospital inpatient costs, loss of life costs and ambulatory care costs where available, based on the most currently available hospital discharge data, vital statistics, census data and other published research. Attributable risk values were applied to the number of Indiana deaths in 2008 and hospital discharges in 2010 to estimate the number of individuals impacted by SHS exposure. All cost estimates were adjusted to 2010 dollar values.

Results: The overall cost of health care and premature loss of life attributed to SHS for Indiana residents was estimated to be $1.3 billion in 2010 -- $237.8 million in health care costs and $879.0 million in loss of life for adults and $89.4 million in health care costs and $98.6 million in loss of life for children. The estimated population for Indiana in 2010 was 6,483,802 resulting in SHS related costs of $201 per capita.

Conclusions: The results of this study provide data estimates needed to educate the public, community leaders, and state policy makers about the health effects and costs of SHS exposure in Indiana.

# INTRODUCTION

Exposure to secondhand tobacco smoke (SHS), also known as environmental tobacco smoke, passive smoking, and involuntary smoking, is a significant contributor to adult and childhood morbidity and mortality in the United States.[1-4] SHS is a complex mixture of gases and particles comprised of smoke from burning cigarettes, cigars or pipe tobacco (side stream smoke), mainstream smoke that is not inhaled by the smoker, and exhaled tobacco smoke. Side stream smoke and mainstream smoke contain the same chemical constituents including at least 250 chemicals known to be toxic or carcinogenic.[1] Exposure of nonsmokers to SHS in adulthood has been causally associated with many medical conditions, including lung cancer, nasal sinus cancer, breast cancer, cervical cancer, ischemic heart disease (myocardial infarction and arteriosclerosis), stroke, eye and nasal irritation, spontaneous abortions and asthma.[2-5] In addition, other studies have suggested that exposure to SHS may be causally associated with adult leukemia, angina pectoris, hearing loss, allergies, periodontal disease, dysmenorrhea, colds, pneumonia, meningococcal disease, macular degeneration, congestive heart failure and cardiac arrhythmia.[2, 6-23] Exposure of children to SHS has been linked to low birth weight, sudden infant death syndrome, respiratory syncytial virus bronchiolitis, asthma exacerbations, otitis media, chronic respiratory symptoms, cystic fibrosis exacerbation, Legg-Perthes disease, allergies, meningococcal disease, loss of hearing and cognitive behavioral impairment.[2-4, 12-13, 15-16, 24-30] Also, many children and adults are injured from fires started by smoking.[4] The Centers for Disease Control and Prevention report that any level of exposure to SHS can be dangerous.[31]

SHS exposure continues to be a major public health concern. First, as presented below,[32] 17.3% of the adult US population was currently smoking in 2010. More of the adult current smokers were male, most often between the ages of 25-54, and were Black. For Indiana in 2010, more of the current smokers were males and more were Black. These statistics suggest that there are many opportunities for non-smokers in Indiana to be exposed to secondhand smoke.

| Adult Smokers in Indiana and the United States, 2010* | | |
|---|---|---|
| | Indiana | United States |
| Adults who are current smokers | 21.2% | 17.3% |
| Males who are current smokers | 23.3% | 18.5% |
| Females who are current smokers | 19.3% | 15.8% |
| 18-24 years of age | 21.2% | 20.0% |
| 25-34 years of age | 26.8% | 23.4% |
| 35-44 years of age | 25.2% | 18.3% |
| 45-54 years of age | 24.8% | 19.5% |
| 55-64 years of age | 19.8% | 16.0% |
| 65 year of age and older | 8.0% | 8.4% |
| White | 20.6% | 16.7% |
| Black | 30.1% | 20.3% |
| Hispanic | 16.8% | 14.9% |

*CDC, Behavioral Risk Factor Surveillance Survey, Prevalence and Trends Data 2010.

Second, many children are exposed to the effects of smoking before birth. The Department of Health and Human Services Substance Abuse and Mental Health Services Administration reports that smoking rates were higher among those who were pregnant and between the ages of 15 to 17 (22.7% pregnant versus 13.4% not pregnant). Furthermore, the combined 2009 and 2010 data show that about 16.4% of pregnant females report "cigarette use during the past month".[33]

**Percent of Pregnant and Non-Pregnant Women Currently Smoking, 2009-2010, United States***
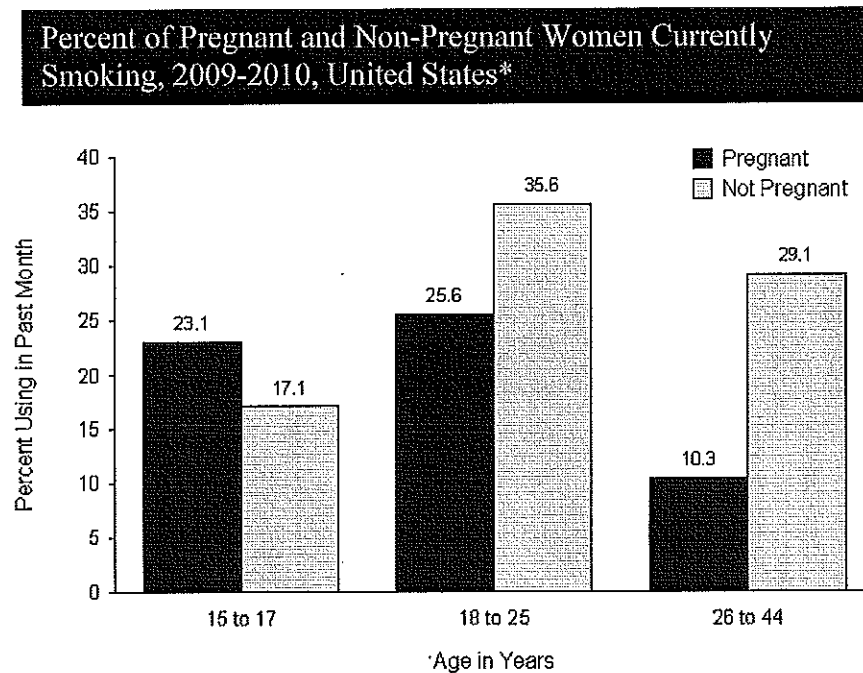


*2010 National Survey on Drug Use and Health Summary of National Findings

Third, it has been estimated that over half (53.6%) of the children in the United States children are exposed to SHS in the home in 2007-2008.[31]

Much work has been done to protect non-smokers from the deleterious effects of SHS with about 79.5% of the U.S. population and 36% of the Indiana population being protected by smoke-free laws as of June 2011[34] and numerous studies have reported the link between SHS exposure and morbidity and mortality among both adults and children. However, little is available in the scientific literature regarding the economic consequences of these adverse SHS related health effects. A study from Minnesota[35] used Blue Cross/Blue Shield claims to estimate the cost to be $44.58 per capita (2003 data). It should be noted that the smoking rate for adults in Minnesota was substantially lower than the smoking rate for adults in Indiana (21.1% in Minnesota vs. 26.1% in Indiana) according to the 2003 BRFSS.[36] The purpose of this report is to update the 2007 estimate

of the costs of health care and premature loss of life resulting from SHS exposure in the Indiana.[37]

METHODS

Costs of SHS related mortality and morbidity were estimated using national attributable risk values for diseases that are known to be causally related to SHS exposure for adults and for children. Estimated costs included hospital inpatient costs, loss of life costs and ambulatory care costs, where available, based on hospital discharge data, vital statistics, and census data. Attributable risk values were applied to the most recent data available (number of deaths in 2008 and hospital discharges in 2010) to determine the number of individuals impacted by SHS in Indiana.

This study used national research-based attributable risk values, community-based demographic data from the U.S. Census Bureau (2010), disease incidence in the community (i.e. disease-specific hospitalizations in 2010), average hospital charges in 2010 for the selected diseases, median age of death for SHS related diseases and an estimated economic value of life as of 2010. The estimated attributable risk values were obtained from articles and reports identified in searches of major literature databases. Of these, three were primary sources used for this study: the 2005 California EPA (CalEPA) Report,[2] the 2006 Surgeon General's Report,[3] and a study conducted by Aligne and Stoddard.[4] The major data source was the CalEPA report, which also provided the basis for many of the health effects cited in the 2006 Surgeon General's Report.[3] The CalEPA report summarized several research studies that presented values based on thorough reviews of meta-analyses, literature syntheses, and epidemiological studies in the U.S. and in other industrialized countries. CalEPA considered peer-review publication and

frequency of article citations in selecting articles used as sources of the attributable risk values. When more than one value was presented in the CalEPA report, this study used the best or median estimate if the studies were equivalent in design. Furthermore, the sources used in the CalEPA report considered sample sizes of the studies, the extent to which the studies accounted for confounding factors, selection bias when comparing groups, bias in ascertaining exposure, and generalizability to the U.S. population.

Questionnaire-based assessments of exposure to SHS are the most widely used method to evaluate individuals' exposure to tobacco smoke. Questionnaires have important advantages: they are relatively inexpensive; they can be feasibly administered in a variety of ways, including mail surveys, telephone surveys, or in person; and they are able to assess both current and past exposures. The disadvantages include difficulties in validation, particularly of a past exposure and the potential for misclassification.[38, 39] Measures of exposure in the studies included in the CalEPA report were often based on self-report questionnaire based assessments. However, the 2006 Surgeon General's Report[3] focused on the importance of using biomarkers to assess exposure. Biomarkers are more specific, sensitive and objective which are necessary qualities for program evaluation and community surveillance. Evidence suggests that prevalence of tobacco smoke exposure is significantly underestimated when using questionnaires. Data from the Third National Health and Nutrition Examination Survey (NHANES III) showed a detectable level of cotinine in 88 percent of nonsmoking adults.[40] which is much higher than community studies of exposure to tobacco smoke.[41] A significant limitation of using biomarkers, however, is that biomarkers measure only current exposure, not lifetime exposure to tobacco smoke. In addition, obtaining access and cooperation of study

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participants to gather specimens for biomarker studies are more costly and the logistics are more difficult. Questionnaires can be used to measure historical exposure, although recall biases do exist. Finally, evidence shows that there is a strong correlation between both sources of exposure assessments.[40, 42-46] Thus, while the use of biomarkers may be preferred, well-designed questionnaires can produce valid results.

The attributable risk values used in the current study were based on research using current measures of exposure based on both questionnaires and biomarkers. While these decisions were dictated by available research, it is believed that the result yielded more conservative measures of attributable risk.

*SHS Adult Morbidity Costs:*

The formula used to calculate the hospitalization costs for each specific attributable disease in adults was:

Hospitalization Costs = AR * H *CH

Where:

AR is the attributable risk of getting the disease if exposed to secondhand smoke;

H is the number of hospitalizations in Indiana for the specific disease; and,

CH is the average charge per hospitalization for the specific disease, adjusted to 2010 dollars.

Attributable risk values used in this study for specific diseases were specified in the CalEPA report.[2] When multiple attributable risks were reported, the attributable risk from the study with the strongest design or the median when all designs were equivalent, was used. The number of hospital discharges (2010) and charges (2010) for the specific

diseases were obtained from annual hospital discharge summaries prepared by the Indiana Hospital Association and provided to the Indiana State Department of Health.

*Limitations in Estimating SHS Adult Morbidity Costs:* The major limitations that affect the validity of the estimated adult morbidity costs relate to data gaps and underlying assumptions. First, annual costs of outpatient care, emergency room care, and prescriptions for the specific diseases were not available and were not included in the cost estimates. Second, costs of pain and suffering were not included in this model. Third, only those diseases with well-documented attributable risks for SHS exposure were included. There are most likely other diseases caused by SHS exposure for which attributable risk rates have not yet been determined. Fourth, this model assumed that the percent of costs attributed to treatment of the specific diseases caused by SHS exposure is the same as the percent of cases of disease that are attributed to secondhand exposure. Finally, it was assumed that the attributable risk values found in the published literature apply to the population in Indiana. Given these limitations, the estimates are conservative and underestimate the true cost of SHS exposure.

*SHS Adult Mortality Costs:*

The mortality costs for each condition attributed to SHS were calculated using the following formula:

$$\text{Loss of Life Costs} = AR * D * VL * [(LE - AD)/LE]$$

Where:

AR is the attributable risk of getting the disease if exposed to secondhand smoke;

D is the number of deaths in Indiana in 2008 for the specific disease;

VL is the estimated value of a full life ($6,100,000 for 2010);

LE is the life expectancy of 78.2 years (2009); and,

AD is the average age of death in 2008 for the specific disease.

The term $[(LE - AD)/LE]$ estimates the proportion of a person's life that is lost due to premature death.

The information needed to calculate these costs included: the disease-specific attributable risk for SHS, the number of deaths for the specific diseases (based on Indiana death certificates for 2008 deaths), an estimate of the value of life, life expectancy (78.2 years as reported by the National Center for Health Statistics based on 2009 deaths[47] and the average age at death for the specific diseases. The same attributable risk values were used for the loss of life estimates as for the costs of hospitalization.

To determine the loss of life costs, the estimated monetary value of life was obtained from the United States Department of Transportation.[48] The value estimated to be $6,100,000 for 2010. This was a substantial increase from the previous estimate of $3,000,000 in 2003.

The median age at death for causes attributed to SHS exposure was subtracted from the average U.S. life expectancy of 78.2 years for 2009 divided by this average life expectancy (78.2 years) to determine the percent of life lost. This percent of life lost was multiplied by the value of life estimate and then multiplied by the number of SHS attributable deaths for each illness to obtain an estimated dollar value for the SHS attributable loss of life.

*Limitations in Estimating SHS Adult Mortality Costs:* There are several limitations related to estimating of the costs of adult mortality from SHS exposure. First, only those diseases with well-documented attributable risks for SHS exposure were

included in our application. Second, it was assumed that the attributable risk values found in the published literature apply to the Indiana population. A third concern is that there may not be agreement on the actual value of a full life, since this is a difficult and subjective variable to quantify. Fourth, this model used the life expectancy at birth, which provides a conservative estimate of the proportion of life lost. A more accurate measure would be to use life expectancy at the time the individual began being exposed to secondhand smoke; however, that age was unknown. Given these limitations, the estimates are conservative and underestimate the true cost of SHS exposure.

*SHS Child Morbidity and Mortality Costs:*

The model for estimating child morbidity and mortality was structured differently to take advantage of the data provided by Aligne and Stoddard.[4] The first step was to estimate the number of events in children using a ratio of the values provided by Aligne and Stoddard to the U.S. population for the particular age group, using this formula:

$$E_{SC} = P_{SC} * (E_{US} / P_{US})$$

Where:

$E_{SC}$ is the estimated number of events in the sub-population of children in Indiana for the applicable disease;

$P_{SC}$ is the number in the applicable sub-population of children in Indiana based on the US Census estimates of children living in Indiana during 2010;

$E_{US}$ is the number of events in the U.S. for the disease in the applicable sub-population; and,

$P_{US}$ is the number in the applicable sub-population based on the US Census reported estimates of children living in the US during 2010.

This calculation was used to determine an estimate of the initial number of events for the Indiana population. The attributable risk estimates, also reported by Aligne and Stoddard,[4] were then applied to the estimated number of events in Indiana. An estimate of the number of events among Indiana youth that can be attributed to SHS exposure was then obtained using the formula:

$$E_{SHS} = AR * E_{SC}$$

Where:

$E_{SHS}$ is the number of events in Indiana attributable to SHS;

AR is the SHS attributable risk of getting the disease if exposed to SHS; and,

$E_{SC}$ is the estimated total number of events in Indiana among both the exposed and non-exposed applicable sub-populations.

Before applying the costs per case estimates reported by Aligne and Stoddard[4] to the number of events, the costs were adjusted to 2010 dollars, using the medical care category of the consumer price indices established by the US Department of Labor.[49] (US Dept of Labor) Finally, the cost estimates for the SHS attributable events were determined by multiplying the costs per event by the number of SHS attributable events in Indiana, using the formula:

$$C_{SHS} = C_E * E_{SHS}$$

Where:

$C_{SHS}$ is the cost of disease attributable to SHS in Indiana;

$C_E$ is the cost per event (office visit, hospitalization, etc.) for each disease adjusted to 2010 U.S. dollars; and,

$E_{SHS}$ is the number of events related to each of the diseases in Indiana attributable to SHS.

The Aligne and Stoddard[4] data included the number of office visits for the SHS related pediatric illness. Their data were used because office visit data were not available for Indiana.

*Limitations in Estimating SHS Costs in Children:* The method used to estimate the costs of exposure to SHS for children relies on the data presented in the Aligne and Stoddard[4] article. The findings in their study (attributable risk, utilization, and cost of care) may not be representative of Indiana although that assumption is made for this study. Also, the diseases included in their analysis may not be a complete list of diseases that can be attributed to SHS exposure. Thus, using only the diseases and conditions in their study would underestimate the actual costs of SHS exposure in Indiana. Also, the Aligne and Stoddard[4] study did not include all sources of health care, such as emergency room and pharmacy costs, which, if included, would have increased the cost of these diseases significantly. Finally, the cost of pain and suffering of the children and their parents were not included in their study; thus, were omitted from this model. Given these limitations, the estimates are conservative and underestimate the true cost of SHS exposure.

## RESULTS

The numbers of hospital discharges in 2010 for the seven conditions attributable to SHS for adults in Indiana are shown in Table 1. While morbid conditions result in many types of contacts with the health care system (office visits, hospitalizations, pharmacy, etc.), only hospitalization data were available for the adult population in

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Indiana.

The deaths for the causes attributable to SHS exposure in Indiana are also shown in Table 1. The mortality statistics were also used to determine the median ages at death from these causes, which were needed to calculate the cost of loss of life.

Table 2 presents the estimated incidence of morbidity and mortality for SHS related medical conditions among children. The numbers of deaths by cause were obtained from the death records provided by the Indiana State Department of Health. The number of low birth weight and very low birth weight deliveries for Indiana were provided by Kids Count.[50] The number of children receiving health care through office visits was determined by applying the estimated number of children in Indiana derived from the 2010 U.S. Census estimates to rates calculated from numbers published in the Aligne and Stoddard article.[4] For example, the number of office visits for otitis media for children less than 15 years old, as reported by Aligne and Stoddard,[4] was divided by the total number of children less than age 15 in the United States (using 2010 census data) to get a national rate of office visits by children in this age group with otitis media. This rate was then multiplied by the total number of children less than 15 years of age in Indiana from the 2010 census to obtain the estimated number of office visits for otitis media in Indiana.

*SHS Adult Morbidity and Mortality Costs:*

Table 1 presents the estimated incidence, attributable risk, and costs of health care and loss of life of SHS related medical conditions for adults. The overall cost of hospitalizations for adults in Indiana attributed to SHS was estimated to be $237.8 million in 2010. The loss of life costs for these same conditions was estimated to be

$879.0 million in 2010. Combined, the SHS morbidity and mortality costs for adults attributed to SHS totaled $1.1 billion in 2010.

*SHS Child Morbidity and Mortality Costs:*

Table 2 presents the estimated incidence, attributable risk, and costs of health care and loss of life for SHS related medical conditions for children. The overall costs of health care for children were estimated to be $89.4 million in 2010. The estimated loss of life costs for these same conditions were $98.6 million in 2010. Combined, the SHS attributable morbidity and mortality costs for children were estimated to total $188.0 million in 2010.

Table 3 summarizes the results of this study. The total economic impact of secondhand smoke exposure on the health of Indiana residents was estimated to be $1.3 billion in 2010. Since the 2010 population of Indiana was estimated to be 6,483,802[51] the total per capita health cost of secondhand smoking in Indiana was estimated to be $201 per person in 2010.

DISCUSSION

Exposure to SHS is not only a significant health concern, but a significant economic concern as well. The developed a model to estimate the health-related costs of SHS exposure on a state level. It was estimated that in 2010, about $327.2 million were spent in Indiana for the hospitalization and health care of patients with diseases attributed to SHS exposure. Additionally, in 2010 an estimated $977.6 million was lost due to premature death that can be attributed to SHS exposure. The total cost (health care costs and the cost of premature loss of life) for diseases attributed to SHS in Indiana was

estimated to be $1.3 billion in 2010 or about $201 per person. These costs do not include the health care and loss of life costs of Indiana residents who are smoking themselves, but only those who are exposed to SHS.

The economic costs of SHS exposure estimated for 2010 were substantially higher than reported for 2007. There are several reasons why the costs increased. First there have been increases in the costs of medical care. Second, the ICD codes for coronary heart disease and stroke have been expanded to more completely include the disease conditions caused by SHS exposure. Finally, the value of life was estimated at $6,100,000 for 2010 by the U.S. Department of Transportation. This was a substantial increase from the previous estimate of $3,000,000.

The cost estimates provided in this report are conservative. The list of conditions used in this study included only those conditions where substantial evidence exists in the literature that a portion of the cases can be attributed to SHS exposure. In addition, not all of the medical care costs could be captured from existing data sources. Finally, we chose the lowest level of the estimated value of a human life provided the federal agencies. Given these decisions, the total estimated economic impact of SHS exposure provided in this report is underestimated.

It is widely known that tobacco use contributes to the increased incidence of disease and premature loss of life in those who smoke; however, many do not recognize the impact of a person's smoking on his or her spouse, children, family members, friends, co-workers and customers. The adult smoking rates in Indiana are higher than the nation as a whole. While the rate of smoking among adults in the U.S. is 17.3%, Indiana's adult smoking rate was 21.2% percent in 2010.[32] It has been estimated that over one-half

(53.6%) of the young children in the U.S., ages 3 to 11, are exposed to SHS in their homes.[31] Since the adult smoking rate in Indiana is higher than the national average, it is reasonable to infer that adults and children in Indiana are exposed to SHS at a higher rate.

The health-related costs arising from SHS exposure could be avoided or reduced in two ways. First and most obvious, the individual should quit smoking. Second, those who continue to smoke tobacco should be discouraged from smoking in their home, their automobile, their workplace and other areas where non-smokers may be exposed to SHS. Banning smoking in public places has been shown to be an effective tool for reducing tobacco-related morbidity across a multiplicity of diseases in adults and children.[52] Comprehensive workplace smoke free laws are needed to protect the health of workers in all work place environments, including restaurants, bars and clubs. If they do not already fall under a community smoking restriction, business owners and managers could consider making their businesses smoke-free. However, such policies need to have the support of the public and business owners. This requires that people clearly understand the magnitude of the consequences of SHS both from an individual health perspective as well as from an economic perspective.

Examining the trend in attitudes about SHS policies in Indiana from 2002 to 2007, Zollinger et al. found a significant increase during this time period in the proportion of individuals who do not allow smoking in their homes, the proportion who are aware that exposure to SHS causes cancer, heart disease and sudden infant death syndrome, and the proportion who are concerned about the health effects of exposure to secondhand smoke.[53] There has been a decrease in the proportion of workers who are exposed to cigarette smoke in their work places, and a decrease in the proportion of individuals who

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have been in a car where someone was smoking.[48]

Given the high incidence of smoking and the relatively weak smoke free policies and poor attitudes related to SHS, Indiana continues to be at high risk for incurring SHS related costs. More effective public policies related to SHS need to be developed in Indiana to achieve lower health care costs and improved overall health status.

The costs of SHS, in addition to its impact on health status, should be considered when developing policy recommendations to combat the effects of tobacco smoking on a population. The costs of morbidity and mortality associated with SHS are directly or indirectly borne by many. Employers bear additional costs for health insurance premiums used to pay for the treatment required for people with the SHS preventable diseases. Employers additionally assume many of the indirect costs associated with tobacco use and SHS such as increased employee sick leave due to SHS exposure or lost work time for smoke breaks. Consumers may assume the additional costs of SHS associated with their portion of insurance premiums and any additional coinsurance and/or co-payments associated with the hospitalization, physician and pharmaceutical costs resulting from exposure to SHS attributable diseases. Society assumes the cost burden for the uninsured population through the large amount of uncollected hospital revenues; taxpayers bear the cost of Medicaid benefits for indigents and for Medicare clients requiring treatment for SHS related diseases. Additionally, society as a whole endures the burden of premature loss of life. The lost productivity and opportunity cost of these losses have effects that carry on for many years.

It is important to use these data to educate consumers, business owners, legislators and policy makers to make them more aware of the huge economic

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consequences of SHS at the state and community level. It is the role of policy makers and government agencies to protect the health of its citizens and to promote the economic prosperity of the community----enacting comprehensive smoke-free legislation clearly fits within that role. Such legislation would reduce the economic burden of SHS exposure by an at least $201 per year for every man, woman and child who lives in Indiana.

## RECOMENDATIONS

Policy recommendations resulting from this study include the following:

- Encourage the use of these findings to further educate the public, as well as community leaders and policy makers, about the health impacts and costs of SHS in Indiana;

- Encourage businesses and institutions that are not already 100 percent smoke-free to totally eliminate smoking at the workplaces and on their grounds, on their campuses including schools, colleges and universities, day care centers, restaurants and other food or beverage service establishments;

- Strictly enforce no smoking restrictions in all public areas, and in businesses and on school campuses;

- Provide more support for smoking cessation programs by businesses, health departments and health care providers; and.

- Encourage smokers not to smoke in shared areas.

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# Table 1

## Incidence, Attributable Risk, Number of Deaths and Hospitalizations, and Costs for Selected Secondhand Smoke (SHS) Related Conditions for Adults - Indiana, 2010

| Disease | Incidence* | Median Age at Death | Attributable Risk** | # Deaths and # Hospitalizations due to SHS Exposure | Costs per Hospitalization and Death (2010 Dollars) | Total Cost (2010 Dollars) |
|---|---|---|---|---|---|---|
| Lung Cancer | 2971 hospitalizations[2] | | 2.19% | 65 | $44,911 | $2,919,215 |
| | 4165 deaths[1] | 70.1 | 2.19% | 91 | $631,841 | $57,497,531 |
| Nasal Sinus Cancer | 16 hospitalizations[2] | | 12.01% | 2 | $74,975 | $149,950 |
| | 10 deaths[1] | 65.1 | 12.01% | 1 | $1,021,867 | $1,021,867 |
| Heart Disease (CHD) | 31760 hospitalizations[2] | | 8.91% | 2830 | $52,853 | $149,573,990 |
| | 8575 deaths[3] | 67.6 | 8.91% | 764 | $826,854 | $631,716,456 |
| Breast Cancer | 1090 hospitalizations[2] | | 14.67% | 160 | $29,576 | $4,732,160 |
| | 929 deaths[1] | 68.3 | 14.67% | 136 | $772,251 | $105,026,136 |
| Stroke | 18906 hospitalizations[2] | | 12.92% | 2442 | $28,863 | $70,483,446 |
| | 3103 deaths[3] | 76.5 | 12.92% | 401 | $132,609 | $53,176,209 |
| Cervical Cancer | 227 hospitalizations[2] | | 9.18% | 21 | $31,804 | $667,884 |
| | 71 deaths[1] | 52.5 | 9.18% | 7 | $2,004,731 | $14,033,117 |
| Asthma | 6125 hospitalizations[5] | | 13.27% | 813 | $11,413 | $9,278,769 |
| | 68 deaths[4] | 54.7 | 13.27% | 9 | $1,833,120 | $16,498,080 |

**Total Hospitalization Costs**   $237,805,414
**Total Loss of Life Costs**   $878,969,396
**Total Costs for Adults**   $1,116,774,810

1. State profile cancer registry data 2008
2. Indiana acute care hospitals, Indiana residents' discharge data for 2010
3. Indiana Mortality Report, 2008 (http://www.in.gov/isdh/reports/mortality/2008/table04/tbl04_00.htm)
4. CDC Wonder Compressed Mortality Data (2007), accessed 12/15/2011 (http://wonder.cdc.gov/controller/datarequest/D53;jsessionid=5206CC7C54514C5C5474E2CBA202D9A91)
5. Indiana State Department of Health, Epidemiology Resource Center, Data Analysis Team from data supplied by the Indiana Hospital Association (2010 discharges)

* Incidence numbers based on Indiana hospital discharge and vital statistics data

** Attributable risk values from published data

Table 2

# Table 2

Incidence, Attributable Risk, Number of Deaths and Medical Care Events, and Costs
for Selected Secondhand Smoke (SHS) Related Conditions for Children -
Indiana, 2010

| Disease | Incidence | | Attributable Risk | Number due to SHS exposure | Costs per Case 2010 Dollars | Total Cost (2010 Dollars) |
|---|---|---|---|---|---|---|
| Sudden Infant Death Syndrome, age <1 year | 44 | SIDS deaths[2] | 19.15% | 8 | $6,100,000 | $48,800,000 |
| Respiratory Syncytial Virus Bronchiolitis age < 2 years | 1667 <br> 2 | hospitalizations[1] <br> deaths[4] | 25.00% <br> 25.00% | 417 <br> 1 | $12,332 <br> $6,021,994 | $5,142,444 <br> $6,021,994 |
| Acute Otitis Media age <15 years | 1,615,777 <br> 67 | office visits <br> hospitalizations[1] | 11.47% <br> 11.47% | 185,293 <br> 8 | $138 <br> $11,321 | $25,570,434 <br> $90,568 |
| Asthma age < 18 years | 285,036 <br> 2226 <br> 0 | Events <br> hospitalizations[1] <br> deaths[3] | 9.84% <br> 9.84% <br> 9.84% | 28,034 <br> 219 | $63 <br> $968 | $1,766,142 <br> $211,992 |
| Acute Lower Respiratory, Bronchitis, Pneumonia | 4564 <br> 34 | hospitalizations[1] <br> deaths[2] | 19.15% <br> 19.15% | 874 <br> 7 | $19,363 <br> $5,475,959 | $16,923,262 <br> $38,331,713 |
| Burns age < 15 years | 166 <br> 16 | hospitalizations[1] <br> deaths[7] | 3.50% <br> 3.50% | 6 <br> 1 | $112,513 <br> $5,475,959 | $675,078 <br> $5,475,959 |
| Low Birth Weight | 7,398 | medical care[5] | 13.52% | 1000 | $24,073 | $24,073,000 |
| Very Low Birth Weight | 1,281 | medical care[6] | 13.52% | 173 | $83,502 | $14,445,846 |
| Spontaneous Abortion | 487 | hospitalizations[1] | 9.29% | 45 | $10,981 | $494,145 |

Total Health Care Costs
Office Visits Costs $27,336,576
Hospital Costs $23,537,489
LBW Medical Care Costs $38,518,846
Total Loss of Life Costs $98,629,666
Total Costs for Children $188,022,577

1. Indiana State Department of Health, Epidemiology Resource Center, Data Analysis Team from data supplied by the Indiana Hospital Association (2010 Discharges)
2. Indiana Mortality Report, 2008  (http://www.in.gov/isdh/reports/mortality/2008/table04/tbl04_00.htm)
3. CDC Wonder Compressed Mortality Data (2007), accessed 12/2011 (http://wonder.cdc.gov/controller/datarequest/D53;jsessionid=5206CC754514C5C5474E2CBA202D9A91)
4. Indiana Mortality Report, 2008 (http://www.in.gov/isdh/reports/mortality/2008/table02/tbl02_00.htm
5. Kids Count Data Center (http://datacenter.kidscount.org/data/acrossstates/Rankings.aspx?loct=2&by=a&order=a&ind=5425&dtm=11984&tf=35) retrieved on 12/15/2011
6. Kids Count Data Center(http://datacenter.kidscount.org/data/acrossstates/Rankings.aspx?loct=2&by=a&order=a&ind=17&dtm=277&tf=35) retrieved 12/15/2011
7. Indiana Mortality Report, 2008 (http://www.in.gov/isdh/reports/mortality/2008/table01/tbl01_00.htm)

# Table 3

Total Health Care and Loss of Life Costs for Selected SHS Related Conditions
Indiana, 2010

## Adults

| | | |
|---|---|---|
| Total Hospitalization Costs | $237,805,414 | |
| Total Loss of Life Costs | $878,969,396 | |
| **Total Costs for Adults** | | **$1,116,774,810** |

## Children

| | | |
|---|---|---|
| Total Health Care Costs | $89,392,911 | |
| Total Loss of Life Costs | $98,629,666 | |
| **Total Costs for Children** | | **$188,022,577** |

**Total Costs for Adults and Children**                    **$1,304,797,387**

**Population of Indiana, 2010**[1]              6,483,802

**Total per Capita Costs**                              **$201.24**

1. http://quickfacts.census.gov/qfd/states/18000.html accessed 1/2012